



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,391	03/02/2005	Serge Gidon	122952	5189

25944 7590 05/16/2006

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

RIVERO, MINERVA

ART UNIT PAPER NUMBER

2627

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/526,391	GIDON ET AL.	
	Examiner	Art Unit	
	Minerva Rivero	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18-20, 22-23, 25-31, 33-34

3. Claim ~~18~~¹⁸ is rejected under 35 U.S.C. 103(a) as being unpatentable over Zahorik (US 2002/0006735), in view of Kuroda *et al.* (US Patent 5,751,686).

4. Regarding claim 18, Zahorik discloses a data recording device comprising a recording medium comprising a substrate whereon there is arranged a resistive layer, said resistive layer being covered by an active layer able to switch from a first electrical resistivity value to a second electrical resistivity value due to the action of a voltage

Art Unit: 2627

applied between the micro-tips and a counter-electrode, device wherein at least one resistive element made of carbon is arranged between the active layer and the micro-tips, the resistive element having a controlled electrical resistivity comprised between the first and second electrical resistivity values of the active layer (*chalcogenide memory element*, [0008], Lines 6-11, see Fig. 4, element 28; *active area*, [0009], Lines 1-9 and [0034], Lines 11-17, see Fig. 4, element 34; *layer of insulating (resistive element) material*, [0036], Lines 1-3, see Fig. 4, element 36; *layer of carbon disposed on each side of the chalcogenide*, [0033], Lines 5-11).

However, Zahorik does not explicitly disclose but Kuroda *et al.* do disclose said data recording device comprises micro-tips (Col. 4, Lines 55-62, See Fig. 4, element 1203).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik with having the device comprise micro-tips, as disclosed by Kuroda *et al.*, in order to enable the device to record data on the recording medium.

5. Regarding claim 19, Zahorik discloses the resistive layer is made of carbon (*layer of insulating (resistive element) material*, [0036], Lines 1-3, see Fig. 4, element 36; *layer of carbon disposed on each side of the chalcogenide*, [0033], Lines 5-11; [0048], Lines 5-8).

Art Unit: 2627

6. Regarding claim 20, Zahorik discloses the resistive element comprises doping elements designed to adjust the electrical resistivity of the resistive element (*insulator layer is a dielectric material such as silicon nitride* (thus the silicon having been doped with nitrogen), [0036], Lines 3-6), and suggest the doping element is Phosphorous. [Phosphorous belongs to the same element group as Nitrogen, thus exhibiting similar dopant properties.]

However, Zahorik does not explicitly disclose but Kuroda *et al.* do disclose the doping element is Boron (*doping B by ion implantation*, Col. 12, Lines 46-47).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik and have the doping element be Boron, as disclosed by Kuroda *et al.*, since Boron is commonly used in the art as a p-type dopant.

7. Regarding claim 22, Zahorik discloses the resistive element is a layer arranged on the active layer (*layer of carbon disposed on each side of the chalcogenide*, [0033]):

8. Regarding claim 23, disclose the resistive layer has an electrical resistivity comprised between the first and second electrical resistivity values of the active layer (*layer of carbon blocks diffusion between chalcogenide layer and electrode layers*, (thus the resistivity of the carbon layer is necessarily higher than the lowest resistivity of the chalcogenide layer), [0033], Lines 5-11).

Art Unit: 2627

9. Regarding claim 25 Zahorik suggests the resistive layer comprises doping elements designed to adjust the electrical resistivity of the resistive layer, (*insulator layer is a dielectric material such as silicon nitride* (thus the silicon having been doped with nitrogen), [0036], Lines 3-6), and the doping element being Phosphorous [Phosphorous belongs to the same element group as Nitrogen, thus exhibiting similar dopant properties.]

However, Zahorik does not explicitly disclose but Kuroda *et al.* do disclose the doping elements are chosen from Boron, Silver and Copper (*doping B by ion implantation*, Col. 12, Lines 46-47; *growing Ag or Cu in the current-limiting thin-film resistor*, Col. 9, Line 66 – Col. 10, Line 8).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik and have the doping element be Boron, as disclosed by Kuroda *et al.*, since Boron is commonly used in the art as a p-type dopant, and to choose from Silver and Copper, as further disclosed by Kuroda *et al.*, in order to adjust the conductivity of the resistive element as needed.

10. Regarding claim 26, Zahorik discloses a protective layer of carbon arranged on the resistive element (*layer of carbon disposed on each side of the chalcogenide*, [0033], Lines 5-11; [0048], Lines 5-8) [See Applicant's Specification, resistive layer and resistive element are made of carbon ([0010] and [0019]).]

Art Unit: 2627

11. Regarding claim 27, Zahorik discloses a thermally insulating layer arranged between the substrate and the resistive layer ([0036]).

12. Regarding claim 28, Zahorik discloses the thermally insulating layer is formed by a crystallized germanium, antimony and tellurium compound ([0035]).

13. Regarding claim 29, Zahorik discloses the crystallized germanium, antimony and tellurium compound is obtained by momentary heating of the partially achieved recording medium ([0008], Lines 6-11).

14. Regarding claim 30, Zahorik discloses the crystallized germanium, antimony and tellurium compound is obtained from a binary germanium and tellurium compound ([0035], Lines 3-6).

15. Regarding claim 31, Zahorik discloses the active layer is formed by a phase change material (*material changes from an amorphous to a crystalline state*, [0008], Lines 6-11).

16. Regarding claim 33, Zahorik suggests the substrate being conducting, it constitutes the counter-electrode ([0038]).

Art Unit: 2627

17. Regarding claim 34, Zahorik discloses the substrate is made of doped silicon ([0043], Lines 3-8).

18. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zahorik (US 2002/0006735), in view of Nonaka *et al.* (US Patent 6,352,753).

Regarding claim 21, Zahorik does not disclose but Nonaka *et al.* do disclose the resistive element has a thickness of about 1 nm (*carbon layer as a boundary layer with a thickness between 0.5 nm and 4 nm*, Col. 7, Lines 64-67).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik with the resistive element having a thickness of about 1 nm, as disclosed by Nonaka *et al.*, in view of carbon film vapor deposition rate and repeatability, as further disclosed by Nonaka *et al.* (Col. 7, Lines 66-67).

19. Claims 24 ~~and 25~~ are rejected under 35 U.S.C. 103(a) as being unpatentable over Zahorik (US 2002/0006735), in view of Hintz (US Patent 5,353,268).

Art Unit: 2627

20. Regarding claim 24, Zahorik does not explicitly disclose but Hintz does disclose the resistive layer has a thickness comprised between 5 and 50 nm (Col. 12, Lines 27-28).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik and have the resistive layer have a thickness comprised between 5 and 50 nm, as disclosed by Hintz, since it is an appropriate thickness for the intended application.

21. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zahorik in view of Ohno *et al.* (US Patent 5,346,740).

22. Regarding claim 32, Zahorik does not explicitly disclose but Ohno *et al.* do disclose the active layer has a thickness smaller than or equal to 50 nm (*optically active layers between 1 and 10 nm*, Col. 2, Lines 62 – Col. 3, Line 2).

Therefore it would have been obvious to one ordinarily skilled in the art at the time of the invention to supplement the teachings of Zahorik and have the active layer have a thickness smaller than or equal to 50 nm, as disclosed by Ohno *et al.*, since limiting the thickness increases recording sensitivity, as further disclosed by Ohno *et al.* (Col. 3, Lines 3-7).

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ovshinsky *et al.* (US Patent 5,335,219) disclose a method for fabricating directly overwriteable memory elements.

Kawade *et al.* (US Patent 5,072,116) disclose a microprobe preparation method.

Wickramasinghe *et al.* (US Patent 6,757,235) disclose an assembly for reading data based on thermal coupling.

Yoshimura *et al.* (US Patent 5,402,410) disclose a high-density storage of information on a substrate with multiple depth and height.

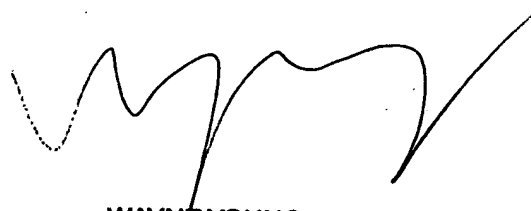
24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minerva Rivero whose telephone number is (571) 272-7626. The examiner can normally be reached on Monday-Friday 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2627

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MR 5/5/06

A handwritten signature in black ink, appearing to read 'WAYNE YOUNG', with a large checkmark-like flourish at the end.

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER